Notice No.4

Rules and Regulations for the Classification of Ships, July 2017

The status of this Rule set is amended as shown and is now to be read in conjunction with this and prior Notices. Any corrigenda included in the Notice are effective immediately.

Please note that corrigenda amends to paragraphs, Tables and Figures are not shown in their entirety.

Issue date: December 2017

Amendments to	Effective date	IACs/IMO implementation (if applicable)
Part 5, Chapter 1, Section 1	1 January 2018	N/A
Part 5, Chapter 2, Section 8	1 January 2018	N/A
Part 5, Chapter 6, Section 3	1 January 2018	1 January 2018
Part 5, Chapter 12, Section 5	1 January 2018	N/A
Part 5, Chapter 24, Section 10	1 January 2018	1 January 2018
Part 6, Chapter 2, Section 9	1 January 2018	N/A
Part 7, Chapter 4, Section 2	1 January 2018	1 January 2018
Part 7, Chapter 4, Section 4	1 January 2018	N/A
Part 7, Chapter 5, Sections 1, 2, 4, 5, 6 & 7	1 January 2018	N/A
Part 7, Chapter 11, Section 3	Corrigenda	N/A

Part 5, Chapter 1
General Requirements for the Design and Construction of Machinery

■ *Section 1*
General

1.4 ~~Departures~~ Deviations from the Rules

~~1.4.1 Where it is proposed to depart from the requirements of the Rules, the Committee will be prepared to give consideration to the circumstances of any special case.~~

~~1.4.2 Any novelty in the construction of the machinery, boilers or pressure vessels is to be reported to the Committee.~~

1.4.1 Any proposal to deviate from the requirements of the Rules will be specially considered.

Part 5, Chapter 2
Reciprocating Internal Combustion Engines

■ *Section 8*
Piping

8.1 Fuel oil, hydraulic and high pressure oil systems

8.1.3 On engines used for propulsion, ~~W~~where fuel oil and hydraulic oil pressure pumps are fitted, and these are essential for engine operation, not less than two fuel oil and two hydraulic oil pressure pumps are to be provided and arranged such that failure of one pump does not render the other pump(s) inoperative. Each fuel oil pump and hydraulic oil pump is to be capable of supplying the quantity of oil for engine operation at its maximum continuous rating and arranged ready for immediate use.

Part 5, Chapter 6
Main Propulsion Shafting

■ *Section 3*
Design

3.12 Sternbushes

3.12.12 Where an ***IWS.** (~~In-water~~ In-Water Survey) notation is to be assigned, *see Pt 1, Ch 2, 2.3 Class notations (hull) 2.3.11*, for water lubricated bearings means are to be provided for ascertaining the clearance in the sternbush with the vessel afloat.

Part 5, Chapter 12
Piping Design Requirements

■ *Section 1*
General

1.7 Materials

1.7.3 The manufacturer's certificate ~~validated by LR~~ for materials for ship-side valves and fittings and valves on the collision bulkhead equal to or less than 500 mm nominal diameter will be accepted in lieu of LR's materials certificate where the valves and fittings are in accordance with a recognised National Standard applicable to the intended application and are manufactured and tested in accordance with the appropriate requirements of the *Rules for the Manufacture, Testing and Certification of Materials, July 2017*. ~~*See Ch 1, 3.1 General 3.1.3.(c)* of the Rules for Materials.~~

■ *Section 5*
Plastic pipes

5.1 General

All content in this sub-Section has been deleted and replaced with the following.

5.1.1 Proposals to use plastic pipes in shipboard piping systems will be considered in relation to the properties of the materials, the operating conditions, the intended service and location. Details are to be submitted for approval. Special consideration will be given to any proposed service for plastic pipes not mentioned in these Rules.

5.1.2 Plastic pipes and fittings will, in general, be accepted in Class III piping systems. Proposals for the use of plastic in Class I and Class II piping systems will be specially considered.

5.1.3 For Class I, Class II and any Class III piping systems for which there are Rule requirements, the pipes are to be of a type which has been approved by LR.

5.1.4 For domestic and similar services where there are no Rule requirements, the pipes need not be of a type which has been approved by LR. However, the fire safety aspects, as referenced in *Pt 5, Ch 12, 5.4 Fire performance criteria* and *Pt 5, Ch 12, 5.5 Additional fire performance criteria applicable to ships*, are to be considered.

5.1.5 The use of plastic pipes may be restricted by statutory requirements of the National Authority of the country in which the vessel is to be registered.

5.2 Design and performance criteria

All content in this sub-Section has been deleted and replaced with the following.

5.2.1 Pipes and fittings are to be of robust construction and are to comply with an acceptable National or International standard, consistent with the intended use. Particulars of pipes, fittings and joints are to be submitted for consideration.

5.2.2 The design and performance criteria of all piping systems, independent of service or location, are to meet the requirements of *Pt 5, Ch 12, 5.3 Design strength*.

5.2.3 Depending on the service and location, the fire safety aspects, such as fire endurance, flame spread, smoke generation, toxicity and fire protection coatings, are to meet the requirements of *Pt 5, Ch 12, 5.4 Fire performance criteria* and *Pt 5, Ch 12, 5.5 Additional fire performance criteria applicable to ships*.

5.2.4 Plastic piping, connections and fittings are to be electrically conductive when:
(a) carrying fluids capable of generating electrostatic charges; or
(b) passing through hazardous zones and spaces, regardless of the fluid being conveyed.
Suitable precautions against the build-up of electrostatic charges are to be provided in accordance with the requirements of *Pt 5, Ch 12, 5.6 Electrical conductivity*.

5.3 Design strength

All content in this sub-Section has been deleted and replaced with the following.

5.3.1 The strength of pipes is to be determined by hydrostatic pressure tests to failure on representative sizes of pipe. The strength of fittings is to be not less than the strength of the pipes.

5.3.2 The nominal internal pressure, p_{Ni}, of the pipe is to be determined by the lesser of the following:

$$p_{Ni} \leq \frac{p_{st}}{4}$$

$$p_{Ni} \leq \frac{p_{lt}}{2,5}$$

where

p_{st} = short term hydrostatic test failure pressure, in bar
p_{lt} = long term hydrostatic test failure pressure (100 000 hours), in bar

Failure pressures obtained over a reduced period and extrapolated in accordance with a recognised National or International Standard will be specially considered.

5.3.3 In service, the pipe is not to be subjected to a pressure greater than p_{Ni}.

5.3.4 The nominal external pressure, p_{Ne}, of the pipe, defined as the maximum total of internal vacuum and external static pressure head to which the pipe may be subjected, is to be determined by the following:

$$p_{Ne} \leq \frac{p_{col}}{3}$$

where

p_{col} = pipe collapse pressure, in bar

5.3.5 p_{col} is not to be less than 3 bar.

5.3.6 Piping is to meet the requirements of *Pt 5, Ch 12, 5.3 Design strength* over the range of service temperature which will be experienced in service.

5.3.7 High temperature limits and pressure reductions relative to nominal pressures are to be in accordance with a recognised standard, but in each case the maximum working temperature is to be at least 20°C lower than the minimum temperature for deflection under load of the resin or plastic material without reinforcement. The minimum heat distortion temperature is not to be less than 80°C. *See also Ch 14, 4 Plastic pipes and fittings* of the *Rules for the Manufacture, Testing and Certification of Materials, July 2017*.

5.3.8 Where it is proposed to use plastic piping in low temperature services, design strength testing is to be made at a temperature 10°C lower than the minimum working temperature.

5.3.9 The selection of plastic materials for piping is to take account of other factors such as impact resistance, ageing, fatigue, erosion resistance, fluid absorption and material compatibility such that the design strength of the piping is not reduced below that required by these Rules.

5.3.10 Design strength values may be verified experimentally or by a combination of testing and calculation methods.

5.4 Fire performance criteria

All content in this sub-Section has been deleted and replaced with the following.

5.4.1 Where a fire protective coating of pipes and fittings is necessary for achieving the fire endurance standards required, the coating is to be resistant to products likely to come into contact with the piping and be suitable for the intended application.

5.4.2 The materials used for plastic pipes, except those fitted on open decks and within tanks, cofferdams, void spaces, pipe tunnels and ducts are to have low flame spread characteristics.

5.4.3 The materials used for plastic pipes within accommodation, service and control spaces are not to be capable of producing excessive quantities of smoke and toxic products that may be a hazard to personnel within those spaces.

5.5 Additional fire performance criteria applicable to ships

5.5.1 Where plastic pipes are used in systems essential to the safe operation of the vessel, or for containing combustible liquids or sea water where leakage or failure could result in fire or in the flooding of watertight compartments, the pipes and fittings, including couplings with flexible internal seals, are to be of a type which has been fire endurance tested in accordance with the requirements of *Table 12.5.1 Fire endurance requirements*.

Table 12.5.1 Fire endurance requirements

	Location										
	A	B	C	D	E	F	G	H	I	J	K
CARGO (FLAMMABLE CARGOES f.p. ≤ 60°C)											
1 Cargo lines	N/A	N/A	L1	N/A	N/A	0	N/A	0[10]	0	N/A	L1[2]
2 Crude oil washing lines	N/A	N/A	L1	N/A	N/A	0	N/A	0[10]	0	N/A	L1[2]
3 Vent lines	N/A	N/A	N/A	N/A	N/A	0	N/A	0[10]	0	N/A	X
INERT GAS											
4 Water seal effluent line	N/A	N/A	0[1]	N/A	N/A	0[1]	0[1]	0[1]	0[1]	N/A	0
5 Scrubber effluent line	0[1]	0[1]	N/A	N/A	N/A	N/A	N/A	0[1]	0[1]	N/A	0
6 Main line	0	0	L1	N/A	N/A	N/A	N/A	N/A	0	N/A	L1[6]
7 Distribution lines	N/A	N/A	L1	N/A	N/A	0	N/A	N/A	0	N/A	L1[2]
FLAMMABLE LIQUIDS (f.p. > 60°C)											
8 Cargo lines	X	X	L1	X	X	N/A[3]	0	0[10]	0	N/A	L1
9 Fuel oil	X	X	L1	X	X	N/A[3]	0	0	0	L1	L1
10 Lubricating oil	X	X	L1	X	X	N/A	N/A	N/A	0	L1	L1
11 Hydraulic oil	X	X	L1	X	X	0	0	0	0	L1	L1

SEA WATER [1]											
12 Bilge main and branches	L1[7]	L1[7]	L1	X	X	N/A	0	0	0	N/A	L1
13 Fire main and water spray	L1	L1	L1	X	N/A	N/A	N/A	0	0	X	L1
14 Foam system	L1	L1	L1	N/A	N/A	N/A	N/A	N/A	0	L1	L1
15 Sprinkler system	L1	L1	L3	X	N/A	N/A	N/A	0	0	L3	L3
16 Ballast	L3	L3	L3	L3	X	0[10]	0	0	0	L2	L2
17 Cooling water, essential services	L3	L3	N/A	N/A	N/A	N/A	N/A	0	0	N/A	L2
18 Tank cleaning services fixed machines	N/A	N/A	L3	N/A	N/A	0	N/A	0	0	N/A	L3[2]
19 Non-essential systems	0	0	0	0	0	N/A	0	0	0	0	0
FRESH WATER											
20 Cooling water essential services	L3	L3	N/A	N/A	N/A	N/A	0	0	0	L3	L3
21 Condensate return	L3	L3	L3	0	0	N/A	N/A	N/A	0	0	0
22 Non-essential systems	0	0	0	0	0	N/A	0	0	0	0	0
SANITARY/DRAINS/SCUPPERS											
23 Deck drains (internal)	L1[4]	L1[4]	N/A	L1[4]	0	N/A	0	0	0	0	0
24 Sanitary drains (internal)	0	0	N/A	0	0	N/A	0	0	0	0	0
25 Scuppers and discharges (overboard)	0[1,8]	0[1,8]	0[1,8]	0[1,8]	0[1,8]	0	0	0	0	0[1,8]	0
SOUNDING/AIR											
26 Water tanks/dry spaces	0	0	0	0	0	0[10]	0	0	0	0	0[11]
27 Oil tanks (f.p. > 60°C)	X	X	X	X	X	X[3]	0	0[10]	0	X	X
ENGINE EXHAUSTS											
28 Main line	0[1]	0[1]	N/A	N/A	0[1]	N/A	N/A	N/A	0[1]	N/A	L1
29 Drain line	0[1]	0[1]	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
MISCELLANEOUS											
30 Control air	L1[5]	L1[5]	L1[5]	L1[5]	L1[5]	N/A	0	0	0	L1[5]	L1[5]
31 Service air (non-essential)	0	0	0	0	0	N/A	0	0	0	0	0
32 Brine	0	0	N/A	0	0	N/A	N/A	N/A	0	0	0

31 Auxiliary low pressure steam (≤ 7 bar)	L2	L2	0[9]	0[9]	0[9]	0	0	0	0	0[9]	0[9]

LOCATION DEFINITIONS

Location		Definition
A	Machinery spaces of Category A	Machinery spaces of Category A as defined in *SOLAS regulation II-2/3.19.*
B	Other machinery spaces and pump rooms	Spaces, other than Category A machinery spaces and cargo pump rooms, containing propulsion machinery, boilers, steam and internal combustion engines, generators and major electrical machinery, pumps, oil filling stations, refrigerating, stabilising, ventilation and air-conditioning machinery, and similar spaces, and trunks to such spaces.
C	Cargo pump rooms	Spaces containing cargo pumps and entrances and trunks to such spaces.
D	Ro-Ro cargo holds	Ro-Ro cargo holds are Ro-Ro cargo spaces and special category spaces as defined in *SOLAS regulation II-2/3.14* and *SOLAS regulation II-2/3.18.*
E	Other dry cargo holds	All spaces other than Ro-Ro cargo holds used for non-liquid cargo and trunks to such spaces.
F	Cargo tanks	All spaces used for liquid cargo and trunks to such spaces.
G	Fuel oil tanks	All spaces used for fuel oil (excluding cargo tanks) and trunks to such spaces.
H	Ballast water tanks	All spaces used for ballast water and trunks to such spaces.
I	Cofferdams, voids, etc.	Cofferdams and voids are those empty spaces between two bulkheads separating two adjacent compartments.
J	Accommodation, service	Accommodation spaces, service spaces and control stations as defined in *SOLAS regulation II-2/3.10, SOLAS regulation II-2/3.12* and *SOLAS regulation II-2/3.22*.
K	Open decks	Open deck spaces, as defined in *SOLAS regulation II–2/26.2.2(5)*.

ABBREVIATIONS

L1	Fire endurance test in dry conditions, 60 minutes, IMO Resolution A.753(18) *Appendix 1 - Test Method for Fire Endurance Testing of Plastic Piping in the Dry Condition*.
L2	Fire endurance test in dry conditions, 30 minutes, IMO Resolution A.753(18) *Appendix 1 - Test Method for Fire Endurance Testing of Plastic Piping in the Dry Condition.*
L3	Fire endurance test in wet conditions, 30 minutes, IMO Resolution A.753(18) *Appendix 2 - Test Method for Fire Endurance Testing of Water-Filled Plastic Piping*.
0	No fire endurance test required.
N/A	Not applicable.
X	Metallic materials having a melting point greater than 925°C.

Note 1. Where non-metallic piping is used, remotely controlled valves are to be provided at vessel's side (valve is to be controlled from outside space).

Note 2. Remote closing valves are to be provided at the cargo tanks.

Note 3. When cargo tanks contain flammable liquids with f.p. > 60°C, '0' may replace 'N/A' or 'X'.

Note 4. For drains serving only the space concerned, '0' may replace 'L1'.

Note 5. When controlling functions are not required by the Rules or statutory requirements, '0' may replace 'L1'.

Note 6. For pipes between machinery space and deck water seal, '0' may replace 'L1'.

Note 7. For passenger vessels, 'X' is to replace 'L1'.

Note 8. Scuppers serving open decks in positions 1 and 2, as defined in *Regulation 13 - Position of hatchways, doorways and ventilators* of the *Load Lines, 1966/1988 - International Convention on Load Lines, 1966, as Amended by the Protocol of 1988*, should be 'X' throughout unless fitted at the upper end with a means of closing capable of being operated from a position above the freeboard deck in order to prevent downflooding.

Note 9. For essential services, 'X' is to replace '0'.

Note 10. For tankers where compliance with MARPOL Annex I, *Regulation 19.3.6* is required, 'N/A' is to replace '0'.

Note 11. Air and sounding pipes on open deck are to be of substantial construction, *see Pt 5, Ch 13, 2.1 Materials 2.1.2*.

~~5.5~~ 5.6 Electrical conductivity

All content in this sub-Section has been deleted and replaced with the following.

5.6.1 Where a piping system is required to be electrically conductive for the control of static electricity, the resistance per unit length of the pipe, bends, elbows, fabricated branch pieces, etc. is not to exceed 0,1 MΩ/m.

5.6.2 Where a piping system is required to be electrically conductive for the control of static electricity, electrical continuity is to be maintained across the joints and fittings and the system is to be earthed. The resistance to earth from any point in the piping system is not to exceed 1 MΩ. *See also Pt 6, Ch 2, 1.13 Bonding for the control of static electricity*.

~~5.6~~ 5.7 Manufacture and quality control

All content in this sub-Section has been deleted and replaced with the following.

5.7.1 All materials for plastic pipes and fittings are to be approved by LR, and are in general to be tested in accordance with *Ch 14, 4 Plastic pipes and fittings* of the *Rules for the Manufacture, Testing and Certification of Materials, July 2017*. For pipes and fittings not employing hand lay up techniques, the hydrostatic pressure test required by *Ch 14, 4.9 Hydraulic test* of the *Rules for the Manufacture, Testing and Certification of Materials, July 2017* may be replaced by testing carried out in accordance with the requirements stipulated in a recognised National or International Standard, consistent with the intended use for which the pipe or fittings are manufactured, provided that there is an effective quality system in place complying with the requirements of *Ch 14, 4.4 Quality assurance* of the *Rules for the Manufacture, Testing and Certification of Materials, July 2017* and the testing is completed to the satisfaction of the LR Surveyor.

5.7.2 The material manufacturer's test certificate, based on actual tested data, is to be provided for each batch of material.

5.7.3 Plastic pipes and fittings are to be manufactured at a works approved by LR in accordance with agreed quality control procedures which shall be capable of detecting at any stage (e.g. incoming material, production, finished article, etc.) deviations in the material, product or process.

5.7.4 Plastic pipes are to be manufactured and tested in accordance with *Ch 14, 4 Plastic pipes and fittings* of the *Rules for the Manufacture, Testing and Certification of Materials, July 2017*. For Class III piping systems the pipe manufacturer's test certificate may be accepted in lieu of an LR Certificate and is to be provided for each consignment of pipe.

~~5.7~~ 5.8 ~~Installation and construction~~ Construction and installation

All content in this sub-Section has been deleted and replaced with the following.

5.8.1 All pipes are to be adequately but freely supported. Suitable provision is to be made for expansion and contraction to take place without unduly straining the pipes.

5.8.2 Pipes may be joined by mechanical couplings or by bonding methods such as welding, laminating and adhesive bonding.

5.8.3 Where bonding systems are used, the manufacturer or installer shall provide a written procedure covering all aspects of installation, including temperature and humidity conditions. The bonding procedure is to be approved by LR.

5.8.4 The person carrying out the bonding is to be qualified. Records are to be available to the Surveyor for each qualified person showing the bonding procedure and performance qualification, together with dates and results of the qualification testing.

5.8.5 Conditions during installation, such as temperature and humidity, which may affect the strength of the finished joints, are to be in accordance with the agreed bonding procedure.

5.8.6 The required fire endurance level of the pipe is to be maintained in way of pipe supports, joints and fittings, including those between plastic and metallic pipes.

5.8.7 Where piping systems are arranged to pass through watertight bulkheads or decks, provision is to be made for maintaining the integrity of the bulkhead or deck by means of metallic bulkhead or deck pieces. The bulkhead or deck pieces are to be of substantial construction and suitably protected against corrosion and so constructed to be of a strength equivalent to the intact bulkhead; attention is drawn to *Pt 5, Ch 12, 5.8 Construction and installation 5.8.1,* details of the arrangements are to be submitted for approval.

5.8.8 Pipes or other fittings attached directly to the plating of tanks and to bulkheads, which are required to be of watertight construction, are to be secured by means of studs screwed through the plating or by tap bolts, and not by bolts passing through clearance holes. Alternatively, the studs or the bulkhead or tank pieces may be welded to the plating.

~~5.8~~ 5.9 ~~Testing~~ Additional requirements for testing plastic pipes for ships

All content in this sub-Section has been deleted and replaced with the following.

5.9.1 Where a piping system is required to be electrically conductive, tests are to be carried out in accordance with *Pt 5, Ch 12, 5.6 Electrical conductivity*.

5.9.2 The hydraulic testing of pipes and fittings is to be in accordance with *Pt 5, Ch 12, 8 Hydraulic tests on pipes and fittings*.

5.9.3 In the case of pipes intended for essential services each qualified person is, at the place of construction, to make at least one test joint, representative of each type of joint to be used. The joined pipe section is to be tested to an internal hydrostatic pressure of four times the design pressure of the pipe system and the pressure held for not less than one hour, with no leakage or separation of joints. The bonding procedure test is to be witnessed by the Surveyor.

Part 5, Chapter 24
Emissions Abatement Plant for Combustion Machinery

■ *Section 10*
Storage and use of chemicals

10.1 Reductants used for selective catalytic reduction (SCR)

10.1.1 Storage tanks that contain urea-based ammonia (e.g. 40 per cent urea with 60 per cent water solution), hereinafter referred to as urea solution, as a reductant, are to comply with the requirements given in *Pt 5, Ch 24, 10.1 Reductants used for selective catalytic reduction (SCR) 10.1.2* to *Pt 5, Ch 24, 10.1 Reductants used for selective catalytic reduction (SCR) 10.1.18*.

10.1.2 Storage tanks are to be arranged in accordance with *Pt 5, Ch 24, 5.1 General 5.1.5* and *Pt 5, Ch 24, 5.1 General 5.1.6*, so that any leakage will be contained and prevented from making contact with heated surfaces.

10.1.3 Storage tanks are to be protected from excessively high or low temperatures. Depending on the operational area of the ship, this may necessitate the fitting of heating and/or cooling systems in accordance with *Pt 5, Ch 24, 5.1 General 5.1.4*. The physical conditions recommended by the applicable recognised standards (such as ISO 18611-3) are to be taken into account to avoid any impairment of urea solution during storage.

10.1.4 The storage tanks may be located within the engine room.

10.1.5 Where storage tanks are integrated, the following are to be considered during the design and construction:

- These tanks shall be designed and constructed as integral part of the hull (e.g. double bottom, wing tanks);
- These tanks shall be coated with appropriate anti-corrosion coating or shall be made of adequate corrosion resistant materials and cannot be located adjacent to any fuel oil and fresh water tank;
- These tanks shall be designed and constructed in accordance with the structural requirements applicable to hull and primary support members described in *Pt 5, Ch 24, 5 Hull construction*; and
- These tanks shall be included in the ship's stability calculation.

10.1.6 The storage tank piping is to meet the requirements of *Pt 5, Ch 24, 7.1 General 7.1.1*.

10.1.7 Pipes or other tank penetrations are to be provided with manual closing valves attached to the tank in accordance with *Pt 5, Ch 24, 7.1 General 7.1.3*.

10.1.8 The storage tank piping and venting systems are to be independent of other ship service piping and/or systems.

10.1.9 The storage tank piping systems are not to be located in accommodation, service spaces or control stations.

10.1.10 Piping systems, tanks and other components which will come into contact with the urea solution are to be of a suitable grade of non-combustible compatible material established to be suitable for the application.

10.1.11 Where storage tanks are installed in closed compartments, the compartments are to be served by an effective mechanical ventilation system providing not less than six air changes per hour, which is independent from the ventilation system of accommodation, service spaces or control stations.

10.1.12 The ventilation system is to be capable of being controlled from outside the compartment and is to be in continuous operation except when the storage tank is empty and has been thoroughly air purged.

10.1.13 The vent pipes of the storage tank are to terminate in an area on the weather deck with no ignition hazard. The tank venting system is to be arranged to prevent entrance of water into the storage tank.

10.1.14 The storage tanks are to be arranged so that they can be emptied, purged and vented. The drainage arrangements are to be independent of drainage arrangements of other systems and shall be capable of draining to a dedicated tank.

10.1.15 Where a storage tank is located within an engine room, a separate ventilation system defined in *Pt 5, Ch 24 Reductants used for selective catalytic reduction (SCR) 10.1.8* is not required when the general ventilation system for the space is arranged so as to provide an effective movement of air in the vicinity of the storage tank, and is to be maintained in operation continuously except when the storage tank is empty and has been thoroughly air purged.

10.1.16 In the event of a ventilation failure, an audible and visual alarm shall be provided outside the compartment adjacent to each point of entry and inside the compartment, together with a warning notice requiring the use of such ventilation.

10.1.17 Each storage tank is to be provided with alarms and safeguards in accordance with *Pt 5, Ch 24, 9.1 General Table 24.9.1*.

10.1.18 For the protection of crew members, the ship is to have suitable personnel protective equipment on board. Eyewash and safety showers are to be provided in locations where chemical contact is most likely to occur. The location (e.g. near storage tank,

loading area etc.) and number of these eyewash stations and safety showers are to be derived from the detailed installation arrangements.

10.1.19 Reductant that uses aqueous ammonia (28 per cent or less concentration of ammonia) is to comply with the requirements given in *Pt 5, Ch 24, 10.1 Reductants used for selective catalytic reduction (SCR) 10.1.20* to *Pt 5, Ch 24, 10.1 Reductants used for selective catalytic reduction (SCR) 10.1.21*.

10.1.20 Aqueous ammonia is not to be used as a reductant in a SCR except where it can be demonstrated that it is not practicable to use urea solution as the reductant.

10.1.21 Where an application is made to use aqueous ammonia as the reductant, then the arrangements for its loading, carriage and use are to be derived from a risk-based analysis.

10.1.22 Reductant that uses anhydrous ammonia (99,5 per cent or greater concentration of ammonia by weight) is to comply with the requirements given in *Pt 5, Ch 24, 10.1 Reductants used for selective catalytic reduction (SCR) 10.1.23* to *Pt 5, Ch 24, 10.1 Reductants used for selective catalytic reduction (SCR) 10.1.25*.

10.1.23 Anhydrous ammonia is not to be used as a reductant in a SCR except where it can be demonstrated that it is not practicable to use urea solution as the reductant, and where the Flag Administration agrees to its use.

10.1.24 Where it is not practicable to use urea solution as the reductant, then it is also to be demonstrated that it is not practicable to use aqueous ammonia.

10.1.25 Where an application is made to use anhydrous ammonia as the reductant, then the arrangements for its loading, carriage and use are to be derived from a risk-based analysis.

Part 6, Chapter 2
Electrical Engineering

■ *Section 9*
Rotating Machines

9.1 General requirements

9.1.21 Converter-fed low voltage propulsion machines ~~with~~ are to have insulation systems ~~rated at more than 1kV are to~~ complying with ~~*Pt 6, Ch 2, 9.1 General requirements 9.1.18*~~ *Pt 6, Ch 2, 9.1 General requirements 9.1.19* where the waveforms are non-sinusoidal or transients exceed 1 kV.

Part 7, Chapter4
Dynamic Positioning Systems

■ *Section 2*
Class notation DP(CM)

2.2 Thrusters

2.2.5 Failure of a thruster system including pitch, azimuth and/or speed control is not to cause an increase in thrust magnitude or change in thrust direction of the failed thruster.

2.2.6 Thrusters are to be provided with individual emergency stop systems in the DP control station. The emergency stop system is to be provided with loop monitoring facilities that will initiate an alarm in accordance with the requirements of *Pt 6, Ch 1, 2.3 Alarm systems, general requirements*. In the event that the loop monitoring alarm is initiated the thruster output is to remain unaltered.

2.2.7 Alternative energy storage (e.g. batteries and fly-wheels) may be used as sources of power to thrusters.

2.3 Electrical systems

2.3.7 There are to be arrangements to prevent overloading of the running generator(s). The tripping of non-essential loads and the temporary reduction in the load demands of electrically driven thrusters may form part of these arrangements. The arrangements are to ensure that sudden load changes resulting from single faults or equipment failures do not create a loss of electrical supplies.

2.4 Control stations

2.4.7 Alarms, in accordance with the requirements of *Pt 6, Ch 1, 2.3 Alarm systems, general requirements*, are to be provided for the following fault conditions as applicable:

(a) When the ship deviates from the area of operation.
(b) When the heading exceeds the allowable deviation.
(c) Position reference system fault (for each reference system).
(d) Heading reference sensor fault.
(e) Vertical reference sensor fault.
(f) Wind sensor fault.
(g) Taut wire excursion limit.
(h) Automatic changeover to a standby position reference system or environmental sensor.

A ~~permanent~~ record of the occurrences of alarms and warnings, and of status changes is to be provided.

2.5 Control system

2.5.7 Safeguards are to be implemented to ensure the integrity of the control system by preventing the connection of unauthorised or unapproved devices or systems.

2.5.8 Where external forces from mission-related systems (cable laying, pipe laying, mooring, etc.) have a direct impact on DP performance, the influence of these systems is to be considered within the DP control system design:

(a) data inputs from the mission-related system are to be provided automatically to the DP control system; and
(b) provision is to be made to provide such data inputs into the DP control system manually.

■ *Section 4*
Class notation DP(AA)

4.1 Requirements

4.1.12 The DP system is to include monitoring of all devices where the FMEA shows that the loss of the device will result in the loss of redundancy provision. Such monitoring is to be provided for all devices where the loss has the potential for failure of equipment to perform an on-demand function, such as protective functions in electrical systems and switchboards, standby equipment, or backup power supplies. The monitoring is to initiate an alarm in accordance with the requirements of *Pt 6, Ch 1, 2.3 Alarm systems, general requirements*.

Part 7, Chapter 5
Ships Equipped for Oil Recovery Operations

■ *Section 1*
General

1.2 Classification and class notations

1.2.1 A ship complying with the applicable requirements of this Chapter will be eligible for the notation **Oil Recovery** or **Oil Recovery (F.P. >60°C)** as appropriate.

1.2.2 A ship dedicated solely to oil recovery duties and complying with the requirements of this Chapter applicable to the **Oil Recovery** notation will be ~~given~~ assigned the class notation **Oil Recovery Ship**. The scantlings will be specially considered on the basis of the requirements of *Pt 4, Ch 9 Double Hull Oil Tankers*.

1.4 Plans and supporting documentation

(Part only shown)

1.4.2 Plans covering the following items are to be submitted for approval:

- Hazardous areas and spaces (not applicable for the notation **Oil Recovery (F.P. >60°C)**).
- Electrical equipment located in hazardous areas and spaces (not applicable for the notation **Oil Recovery (F.P. >60°C)**).

■ *Section 2*
Oil recovery

2.2 Equipment and deck arrangement

2.2.4 ~~At~~ For assignment of the notations **Oil Recovery** or **Oil Recovery Ship**, at least two portable instruments are to be available on board for gas detection.

■ *Section 4*
Machinery arrangements

4.1 Piping arrangements

4.1.3 For assignment of the notations **Oil Recovery** or **Oil Recovery Ship**, ~~Ventilation~~ ventilation outlets from the recovered oil tanks are to have a minimum height of 2,4 m above deck and be fitted with flame screens. Temporary pipe sections may be used for this purpose. Outlets are to be located not less than a 5 m radius ~~measured horizontally~~ from the nearest air intakes and openings to accommodation and enclosed spaces containing a source of ignition and from deck machinery and equipment which may constitute an ignition hazard.

4.2 Pump room for recovered oil

4.2.8 The requirements of *Pt 7, Ch 5, 4.2 Pump room for recovered oil 4.2.1* to *Pt 7, Ch 5, 4.2 Pump room for recovered oil 4.2.7* are not applicable for assignment of the notation **Oil Recovery (F.P. >60°C)**.

4.2.9 Pump rooms for recovered oil on board ships to be assigned the notation **Oil Recovery (F.P. >60°C)** are to satisfy the relevant requirements of *Pt 5, Ch 1, 4.5 Ventilation*.

Existing paragraph 4.2.8 has been renumbered 4.2.10.

4.4 Exhaust systems

4.4.1 For assignment of the notations **Oil Recovery, Oil Recovery Ship** or **Oil Recovery (F.P. >60°C)**, ~~The~~ the exhaust lines of engines, boilers and equipment containing sources of ignition and the vents of engine crank cases are to be ~~led to a position outside any hazardous area as defined in *Pt 7, Ch 5, 5.3 Hazardous zones and spaces*. In addition, suitable spark arrestors are to be~~ fitted with suitable spark arrestors.

4.4.2 For assignment of the notations **Oil Recovery** or **Oil Recovery Ship**, the exhaust lines of engines, boilers and equipment containing sources of ignition and the vents of engine crank cases are to be led to a position outside any hazardous area as defined in *Pt 7, Ch 5, 5.3 Hazardous zones and spaces*.

4.4.3 For assignment of the notation **Oil Recovery (F.P. >60°C)**, the exhaust lines of engines, boilers and equipment containing sources of ignition and the vents of engine crank cases are to be fitted with suitable spark arrestors.

■ *Section 5*
Electrical equipment

5.1 General

5.1.2 The requirements of *Pt 7, Ch 5, 5 Electrical equipment* are not applicable for assignment of the notation **Oil Recovery (F.P. >60°C)**.

5.1.3 The electrical installations on board ships to be assigned the notation **Oil Recovery (F.P. >60°C)** are to satisfy the relevant requirements of *Pt 6, Ch 2 Electrical Engineering*.

5.3 Hazardous areas

(Part only shown)

5.3.3 The following areas are regarded as hazardous, **zone 1**:

(c) Areas on open deck within a 3 m radius of:

(i) ventilation outlets of tanks intended for recovered oil; or

(ii) inspection hatches permitted to be opened under normal operating conditions of tanks intended for recovered ~~Oil~~ oil; or

(iii) any sampling or sounding points of tanks intended for recovered oil; or

(iv) any flanged joints, glands or other parts of any equipment containing or contaminated with recovered oil from which leakage may occur under normal operating conditions; or

(v) ventilation outlets from spaces described by *Pt 7, Ch 5, 5.3 Hazardous areas 5.3.3.(a)* or *Pt 7, Ch 5, 5.3 Hazardous areas 5.3.3.(b)*.

Where the hazard results from flammable gas or vapour having a density relative to that of air of more than 0,75, the hazardous zone is considered to extend vertically downward to solid deck, or for a distance of 9 m, whichever is the lesser.

■ *Section 6*
Fire protection and extinction

6.1 Structural fire protection

6.1.1 Where provision is made for heating of the collected oil, the requirements of *Pt 7, Ch 5, 6 Fire protection and extinction* are applicable for assignment of the notation **Oil Recovery (F.P. >60°C)**. Where there is no provision for heating the collected oil, the requirements of *Pt 7, Ch 5, 6 Fire protection and extinction* are not applicable for assignment of the notation **Oil Recovery (F.P. >60°C)** in this case the structural fire protection is to be installed as required by the applicable rules for a cargo ship.

Existing paragraphs 6.1.1 to 6.1.3 have been renumbered 6.1.2 to 6.1.4.

■ *Section 7*
Operating Manual

7.1 General

7.1.3 For assignment of the notation **Oil Recovery (F.P. >60°C)**, the operating manual is to provide information regarding procedures to monitor and record the flash point of the recovered oil. The procedures are to include guidance for stopping oil recovery operations if the flash point of the recovered oil is 60°C or lower.

Part 7, Chapter 11
Arrangements and Equipment for Environmental Protection (ECO Class Notation)

■ *Section 3*
Supplementary characters

3.3 Ballast water treatment – BWT characters

3.3.1 Where a ballast water treatment system is installed, the character **BWT** will be assigned, provided that the treatment system is installed, utilised and approved in accordance with *Resolution MEPC.279(70) – 2016 Guidelines for Approval of Ballast Water Management Systems (G8) – (Adopted on 28 October 2016), Resolution MEPC.174(58) – Guidelines for Approval of Ballast Water Management Systems (G8) – (Adopted on 10 October 2008)* or *Resolution MEPC.125(53) - Guidelines for Approval of Ballast Water Management Systems (G8) - (Adopted on 22 July 2005)* and *Pt 5, Ch 25 Ballast Water Treatment System and Installation*.

3.3.2 As an alternative to a system approved in accordance with *Resolution MEPC.279(70) – 2016 Guidelines for Approval of Ballast Water Management Systems (G8) – (Adopted on 28 October 2016), Resolution MEPC.174(58) – Guidelines for Approval of Ballast Water Management Systems (G8) – (Adopted on 10 October 2008)* or *Resolution MEPC.125(53) - Guidelines for Approval of Ballast Water Management Systems (G8) - (Adopted on 22 July 2005)*, a system meeting the requirements of *Regulation D-4 - Prototype Ballast Water Treatment Technologies Prototype Ballast Water Treatment Technologies* of the BWM Convention will be accepted.

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